

Claims

- [c1] 1. A flow directing device for use in a gas turbine engine, comprising:
an airfoil having a leading edge, a trailing edge, a suction side and a pressure side;
a wall abutting said airfoil; and
a fillet between said airfoil and wall;
wherein said fillet has an enlarged section at said leading edge, along said suction and pressure sides, and towards said trailing edge.
- [c2] 2. The flow directing device of claim 1, wherein said suction side and said pressure side of said airfoil each have a gage point, said enlarged section ending adjacent said gage points.
- [c3] 3. The flow directing device of claim 1, wherein said fillet extends a distance from said airfoil, a maximum distance located in said enlarged section on said suction side of said airfoil.
- [c4] 4. The flow directing device of claim 3, wherein said airfoil has a stagnation line and said maximum distance is adjacent said stagnation line.
- [c5] 5. The flow directing device of claim 3, wherein a minimum of said distance located on a normal section of said fillet, said maximum distance approximately 8 times greater than said minimum distance.
- [c6] 6. The flow directing device of claim 1, wherein said fillet extends a height from said wall, a maximum of height located in said enlarged section on said suction side of said airfoil.
- [c7] 7. The flow directing device of claim 6, wherein said airfoil has a stagnation line and said maximum height is adjacent said stagnation line.
- [c8] 8. The flow directing device of claim 6, wherein a minimum of said height is located in a normal section of said fillet, said maximum distance approximately 10 times greater than said minimum height.
- [c9] 9. The flow direction device of claim 6, wherein said airfoil has a span and said

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maximum distance is approximately 30 percent of said span.

- [c10] 10. The flow directing device of claim 1, wherein said enlarged section has a linear height profile.
- [c11] 11. The flow directing device of claim 1, wherein said enlarged section has an arcuate height profile.
- [c12] 12. The flow directing device of claim 1, wherein said enlarged section has a variable curvature.
- [c13] 13. The flow directing device of claim 12, wherein said enlarged section does not have any slope discontinuities.
- [c14] 14. A vane segment, comprising:
 - at least one platform;
 - a plurality of airfoils extending from said at least one platform, each of said airfoils having a leading edge, a trailing edge, a suction side and a pressure side; and
 - a fillet between each of said airfoils and said platform;
 - wherein each of said fillets have an enlarged section at said leading edge, along said suction and pressure sides, and towards said trailing edge.
- [c15] 15. The vane segment of claim 14, wherein said suction side and said pressure side of said airfoil each have a gage point, said enlarged section ending adjacent said gage points.
- [c16] 16. The vane segment of claim 14, wherein said fillet extends a distance from said airfoil, a maximum of said distance located in said enlarged section on said suction side of said airfoil.
- [c17] 17. The vane segment of claim 16, wherein said airfoil has a stagnation line and said maximum distance is adjacent said stagnation line.
- [c18] 18. The vane segment of claim 16, wherein a minimum of said distance is located in a normal section of said fillet, said maximum distance approximately 8 times greater than said minimum distance.

- [c19] 19. The vane segment of claim 14, wherein said fillet extends a height from said wall, a maximum of said height located in said enlarged section on said suction side of said airfoil.
- [c20] 20. The vane segment of claim 19, wherein said airfoil has a stagnation line and said maximum height is adjacent said stagnation line.
- [c21] 21. The vane segment of claim 19, wherein a minimum of said height is located in a normal section of said fillet, said maximum distance approximately 10 times greater than said minimum height.
- [c22] 22. The flow direction device of claim 19, wherein said airfoil has a span and said maximum distance is approximately 30 percent of said span.
- [c23] 23. The vane segment of claim 14, wherein said enlarged section has a linear height profile.
- [c24] 24. The vane segment of claim 14, wherein said enlarged section has an arcuate height profile.
- [c25] 25. The vane segment of claim 14, wherein said enlarged section has a variable curvature.
- [c26] 26. The vane segment of claim 23, wherein said enlarged section does not have any slope discontinuities.
- [c27] 27. A method of reducing heat load on an airfoil, comprising the steps of:
providing an airfoil with a proximal end that abuts a wall, a distal end and a medial section between said ends;
flowing a gas over said airfoil, said gas adjacent said medial section of said airfoil having a higher temperature than said gas flowing over said proximal end of said airfoil; and
directing said gas from said proximal end of said airfoil to said medial section of said airfoil.
- [c28] 28. The method of claim 27, wherein said directing step includes providing a fillet between said airfoil and said wall, said fillet having an enlarged section .